

RUSH'S MILL BRIDGE  
Spanning Plum Creek  
Sinking Springs Vicinity  
Berks County  
Pennsylvania

HAER No. PA-211

HAER  
PA  
6-SINSP.V,  
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PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record  
National Park Service  
Department of the Interior  
P.O. Box 37127  
Washington, D.C. 20013-7127

HISTORIC AMERICAN ENGINEERING RECORD

RUSH'S MILL BRIDGE

HAER No. PA-211

Location: Spanning Plum Creek at the north end of the Union Canal Bicycle and Walking Trail, Sinking Spring vicinity, Berks County, Pennsylvania

UTM: 18/414450/4469470  
Quad: Sinking Spring, Pennsylvania

Date of Construction: Originally constructed in 1869, bridge was dismantled in late 1970s and reassembled in 1980 at new location.

Fabricator: Simon Dreibelbies  
Berks County, Pennsylvania

Present Owner: Berks County Parks and Recreation Department  
Box 272, RD 5  
Sinking Spring, PA 19608

Present Use: Pedestrian and bicycle traffic

Significance: Rush's Mill Bridge is one of a small number of composite cast- and wrought-iron bridges yet remaining in the U.S. It is also one of the few existing examples employing the Howe-truss form in which the cast diagonals are compression members and the wrought-iron vertical elements are tension members.

Historian: Robert W. Hadlow, August 1991

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Rush's Mill Bridge is a Howe-truss span, built in 1869, that once carried pedestrian and vehicular traffic across the West Branch of Perkiomen Creek in Hereford Township, Berks County, Pennsylvania. It was moved in the late 1970s to its present location to serve as part of the Union Canal Bicycle and Walking Trail, where people may leisurely travel across it and admire its beauty.

Composite cast- and wrought-iron bridges form part of the progression in American bridge design from the 1850s to the early 1870s. Widely perceived as more durable than all-wood or composite wood and iron spans, composite iron bridges used cast iron for all members under compression and wrought iron for all members in tension. Cast iron, because of its brittleness, was unsuitable for situations involving bending and tension, while wrought iron, though equally suitable in compression or tension applications, was prohibitively expensive, driving fabricators to use less expensive cast iron wherever possible. Nevertheless, the popularity of composite iron spans waned with the advent of less costly methods for producing wrought iron and steel after the Civil War. By the late 1870s composite cast- and wrought-iron bridge fabrication had nearly vanished, with the exclusive use of wrought iron in bridge fabrication. By the 1890s, steel had supplanted iron as the material of choice.

The Howe truss was the invention of William Howe, a millwright from Spenser, Massachusetts, sometime prior to 1850. Howe had improved the design of an all wood truss panel patented by Colonel Stephen H. Long in 1830. Long had created truss panels in which diagonals served in compression and verticals in tension, but Howe found that wood under tension tended to pull apart at the joints. He substituted iron rods for the vertical tension members of Long's truss panel and added turnbuckles and nuts at the tops and bottoms for adjustment. In 1846 Frederick Harbach patented an all-iron variation of the Howe Truss, using cast-iron compression members and wrought-iron tension members. Bridge builders often used Howe's truss panels because they could be prefabricated away from the proposed site and later assembled by unskilled labor.<sup>1</sup>

### The Bridge Site

Hereford Township first saw white settlers in the 1730s, when Schwenkfelders (members of a Silesian religious sect who left their homeland to escape Roman Catholic persecution) moved to the area at the invitation of the Penn family, who tolerated religious diversity. The Schwenkfelders harnessed the abundant waters of Perkiomen Creek to operate various types of mills,

including those producing linseed oil, flour, lumber,, as well as carding mills.<sup>2</sup>

All of Hereford and neighboring townships had an abundance of iron ore deposits. Charcoal furnaces were built at various locations, including on the West Branch of Perkiomen Creek. There, water supplied power to run the blasts of a number of small charcoal furnaces, one near the village of Huff's Church and others downstream a few miles; the owners of these mills also ground grain or sawed lumber.

Little is known of Daniel Hunter and his mill except that in the early nineteenth century his business passed on to a man named John Rush. Histories of Berks County list Rush as a volunteer in Captain George Ritter's company from York that served from late August 1814 to early March 1815 in the War of 1812. About this time the site of Hunter's furnace became "Rush's Mill, the name by which it known today."<sup>3</sup>

#### The Bridge at Rush's Mill

On 7 June 1869, the Commissioners of Berks County met to discuss the sale of bridge stock for a span in Douglasville, and opened proposals for a span across Maiden Creek at Dreibelbies Mill in Greenwich Township and for a span across "a Branch of Perkiomen Creek at Rush's Mill." Of the five bids presented for the second bridge, four were withdrawn, leaving the bid of Simon Dreibelbies as the sole proposal, with estimated costs for construction at \$2,050.<sup>4</sup>

Little is known of Simon Dreibelbies. There were many members of the Dreibelbis or Dreibelbies family in Berks County during the mid-nineteenth century, but all branches originated from the Dreibelbies who came as part of the Schwenkfelder migration in the 1730s. Morton Montgomery's Historical and Biographical Annals of Berks County (1909) lists a Simon Dreibelbis, born in 1819 in Richmond Township, who worked for years as a hotel keeper in nearby Virgenville until his death in 1890. His son Simon, born 9 March 1856, would have been 13 years old when Rush's Mill Bridge was built. An Alfred H. Dreibelbies of Schuylkill County, born on 12 July 1850, worked first carrying water for the Philadelphia and Reading Railroad at Ringold before learning and practicing blacksmithing for the next twelve years. Afterward, he was employed as a bridge builder for the Philadelphia and Reading. Although he may possibly have constructed the Rush's Mill Bridge, he would have been only 19 years old at the time of its fabrication; like Simon, Jr. above, he would probably have been too young at the time. It may be that Simon Dreibelbis, Sr.

participated in the erection of bridges as a sideline to farming and the hotel business, but little else about him can be learned from published sources.

#### Maintenance of the Bridge

Records of repair and maintenance for the Rush's Mill Bridge do not exist for the years prior to the mid-1970s. One could speculate that the span underwent routine painting and original masonry abutments were re-pointed on a necessary basis. It appears from photographs taken of the structure in 1974 that the deck consisted of wide timber planking with a pair of wooden tire tracks atop it. This was probably replaced at least once in the time that the bridge spanned Perkiomen Creek. The only obvious repair to the bridge was the substitution of a pair of wooden diagonals on one of the truss panels for a pair of cast-iron members. The date for this is unknown.

A structural analysis of the bridge, completed in 1968 by General Consultants, Inc. of Reading, included the following observations:

1. Overall, the trusses appeared to be "sound." Longitudinally, they were "distorted to a slight degree," indicating that they had undergone some "excessive stresses."
2. The stringers and planking appeared in "very good condition." This suggested that they were only 10 to 15 years old.
3. The transverse floor beams were spaced "non-uniformly." Some were of wood construction, others of steel. The wood members were connected to the lower chord by two bolts drilled through them and secured on the bottom by a nut and washer. For the steel beams, U-bolts connected them to the lower chords of the trusses.

The consultants evaluated the span's load carrying capacity. With the "standard AASTHO H-15 truck" loading as the basis for analysis, they recommended rating the steel floor beams at four tons and the timber floor beams at one-ton live load limit. The truss system, it was believed, could withstand loads in excess of 15 tons, but because of the unknown metal properties of a bridge such as this, "repetitious loadings of this nature could prove unsatisfactory over an extended period."<sup>5</sup>

It appears that after reading the General Consultants' report, Berks County decided to schedule Rush's Mill Bridge for replacement. In October 1974, the director of the county's parks

and recreation department, William Semmel, enquired about his agency acquiring the structure from the county. He hoped to use the span somewhere along the Union Canal Bicycle and Walking Trail on the old Union Canal towpath, near Reading.<sup>6</sup>

#### Reconstruction of Rush's Mill Bridge

In the 1970s, the Berks County Parks and Recreation Department began developing a property it owned called Tulpehocken Creek Valley Park. Encompasses land and structures along 4-1/2 miles of the stream, it included two homesteads dating from the mid- to late-nineteenth century.

An added attraction for park visitors is a restored portion of the Union Canal. It parallels Tulpehocken Creek within the park boundaries. Originally completed in 1827, the canal was nearly 80 miles long and ran from Reading, along Tulpehocken Creek and the Schuylkill River, to Middletown on the Susquehanna. Its first engineer, William Weston copied the design of canals in his native England, accounting for the Union Canal's narrow and shallow dimensions that made it unpopular with navigators and boatman.

Locks along the section of the canal within the park have been restored, as has the towpath which is popular with joggers and bicyclists. The canal originally crossed Plum Creek, which runs into Tulpehocken Creek, by way of a wooden and stone aqueduct. This structure no longer exists, but in 1980, next to its site on the towpath, the Park Commission erected Rush's Mill Bridge.<sup>7</sup>

In 1980 the bridge trusses were re-erected at the edge of the park, with a wooden deck wide enough to accommodate only pedestrian traffic. Knee braces were added to each truss, but no other modifications to the structure are apparent.

The bridge marks the park's west boundary, near Reber's Bridge Road. It shares this with the U.S. Army Corps of Engineers' Blue Marsh Lake Project, an irrigation reservoir and park created in the early 1980s. Berks County Parks and Recreation Department officials envisioned that the Union Canal Bicycle and Walking Trail would one day continue from Rush's Mill Bridge through the reservoir area. This has yet to happen.

#### Project Information

This recording project is part of the Historic American Engineering Record (HAER), National Park Service. It is a long-

range program to document historically significant engineering and industrial works in the United States.

The Cast- and Wrought-Iron Bridges Recording Project was co-sponsored in 1991 by the Historic American Engineering Record and the West Virginia University Institute for the History of Technology and Industrial Archaeology. Fieldwork, measured drawings, historical reports, and photographs were prepared under the general direction of Dr. Robert J. Kapsch, Chief, HABS/HAER; Eric N. DeLony, Chief and Principal Architect, HAER; Emory L. Kemp, Director, Institute for the History of Technology and Industrial Archaeology, and Dean Herrin, HAER Staff Historian.

The Recording Team consisted of Christine Ussler (Architecture Faculty, Lehigh University), Architect and Field Supervisor; Christine Theodoropoulos, P.E. (Architecture Faculty, California State Polytechnic University, Pomona); Wayne Chang (University of Notre Dame), Monika Korsos (Technical University of Budapest, Hungary, US/ICOMOS), Architectural Technicians; Robert W. Hadlow (Washington State University), William Chamberlin, P.E., Historians; and Joseph E. B. Elliott (Muhlenberg College), Photographer.

APPENDIX 1

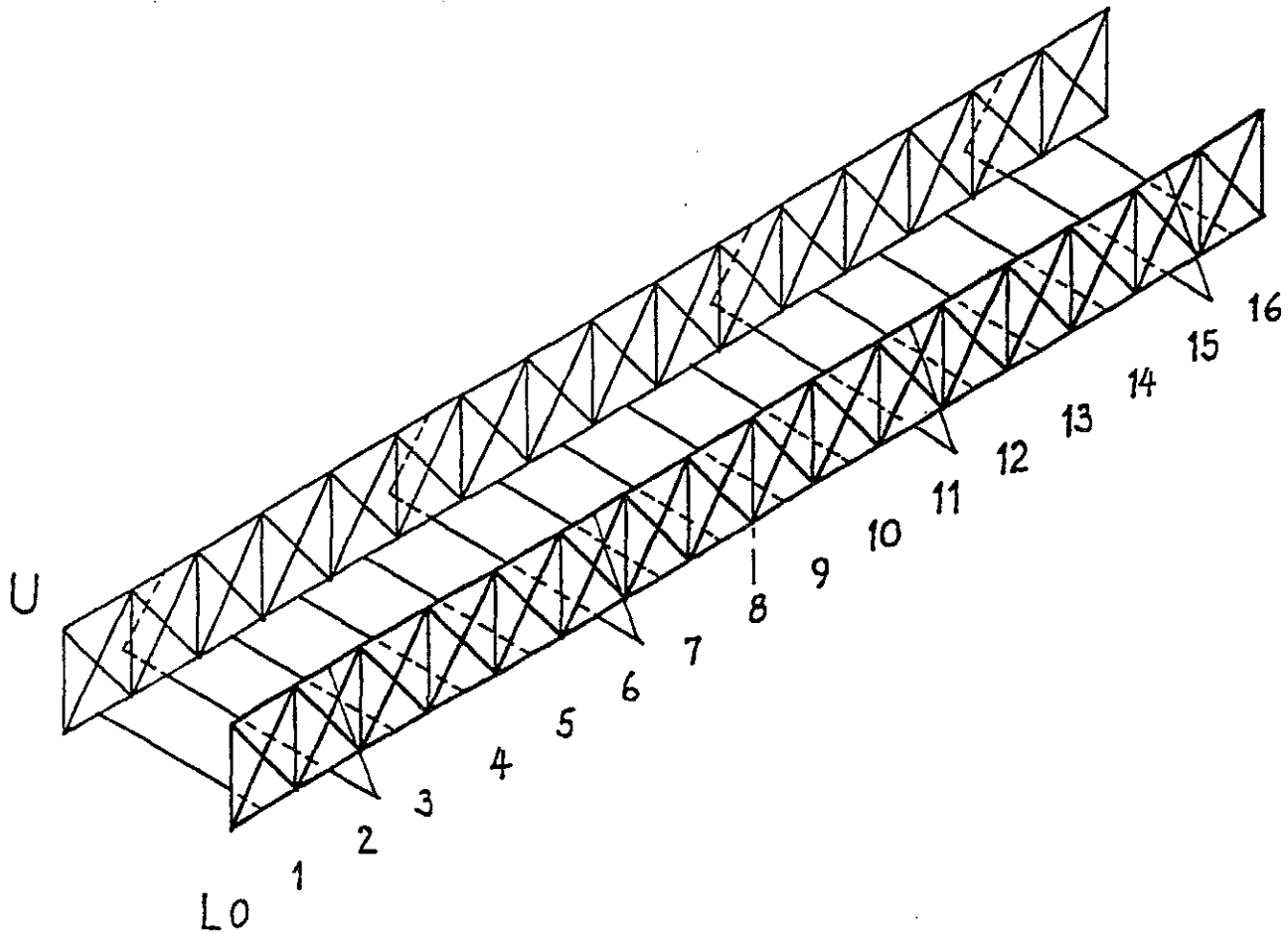


Table A: Bridge Dimensions

Truss type . . . . .	Howe pony truss
Number of spans . . . . .	1
Number of panels . . . . .	16
Panel width, center to center of web posts . . . . .	3'- 3 3/8"
Bridge length, L <sub>0</sub> to L <sub>16</sub> . . . . .	52'- 6"
Distance between upper and lower chords, center to center . . . . .	4'- 1 1/8"
Distance between trusses, center to center . . . . .	7'- 6"

Data Limitations

Official records shed little light on Rush's Mill Bridge. The only county holdings that pre-date 1900 were the County Commissioners' Minutes. According to personnel in the County Clerk's Office in Reading, anything else prior to 1900, such as court petitions, are unavailable or no longer exist. The county engineer's office has a maintenance file on Rush's Mill Bridge, but this covers only recent repairs to the structure. The Berks County Parks and Recreation Department had no records concerning the bridge. Hereford Township officials and the township historian do not know of the location of older records of their jurisdiction.

The Berks County Historical Society has no records on bridges or bridge builders in the county. The Reading Public Library has a large collection of Pennsylvania history monographs and chronologies, including several nineteenth-century publications on Berks County history. The Schwenkfelder Library, at Pennsburg, in nearby Montgomery County, has published and unpublished histories on the Schwenkfelder sectarians, but nothing which would contribute to this study.

ENDNOTES

1. David Plowden, Bridges: The Spans of North America (New York: W. W. Norton and Company, 1974), 37-38, 61.
2. Morton L. Montgomery, History of Berks County in Pennsylvania (Philadelphia: Evert and Richards, 1886; reprint, Reading: Historical Society of Berks County, 1975), 996-998 (page references are to reprint edition).
3. Ibid., 998.
4. Berks County, Pennsylvania, Minutes of the Commissioners, volume for 1858-1875 (handwritten), in Office of County Commissioners, Berks County Courthouse, Reading, Pennsylvania, 7 June 1869, passim. In general, records of Berks County, including those of the Commissioners, Clerk, or Auditor are either unavailable or no longer exist for the years prior to 1900.
5. "Structural Analysis of Rush's Bridge," by General Consultants, Inc, Reading, PA, 1968, in Maintenance File, Bridge 48-A, Office of the Engineer, Berks County Courthouse, Reading, PA.
6. William W. Semmel, Director, Parks and Recreation, to Frank C. Minnich, County Engineer, 3 October 1974, in Maintenance File, Bridge 48-A, Berks County Engineer.
7. For information on the Union Canal Bicycle and Walking Trail see: Pennsylvania, Berks County, Department of Parks and Recreation, Union Canal Towpath Tour, brochure, c.1990; Owen C. Stout, "Now Joggers Can Keep Their Feet Dry," The Eagle (Reading, Pennsylvania), 1 July 1980, in scrapbook held by the Blue Marsh Lake Project, U.S. Army Corps of Engineers, Berks County, PA.

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ADDENDUM TO  
RUSH'S MILL BRIDGE  
Spanning Plum Creek  
Sinking Springs vicinity  
Berks County  
Pennsylvania

HAER No. PA- 211

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